NOAA Testbeds and Proving Grounds 2016 Annual Workshop

Paula Davidson, Chair

NOAA Testbeds & Proving Grounds Coordinating Committee

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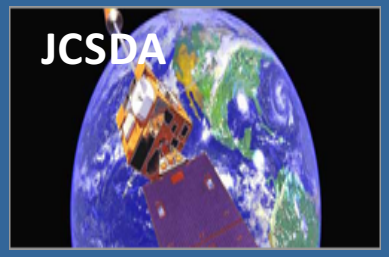
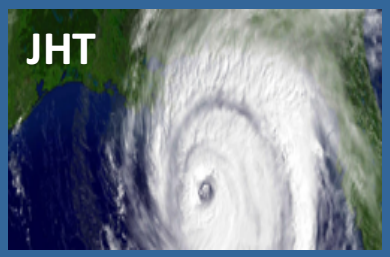
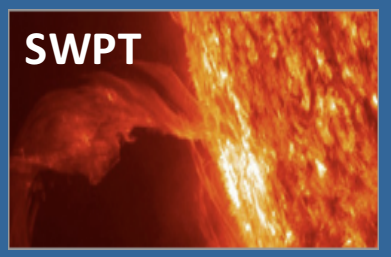
Current NOAA TBPG

NOAA Testbed and Proving Ground (TBPG) Portal







http://www.testbeds.noaa.gov (thanks to: Rich Lataitis & Barb deLuisi)

Background

NOAA operates a number of testbeds (TB) and operations and services proving grounds (PG), but before 2011 lacked a systematic approach for their function, mode of operation, and reporting results

In 2011, NOAA TBPG guidelines and Coordinating Committee established:

- Roles/responsibilities, Function and execution, Governance
- Performance Measures guidance added, 2012
- Increased R&D leveraging, collaboration for transitions focused on NOAA operations/applications
- Focal point for coordinated/consolidated efforts to increase effectiveness of NOAA TBPG and transition efforts

TBPGCC provides integrated information on background and recent progress at: www.testbeds.noaa.gov

Increasing reliance on TBPG for advancing R2O/A/U

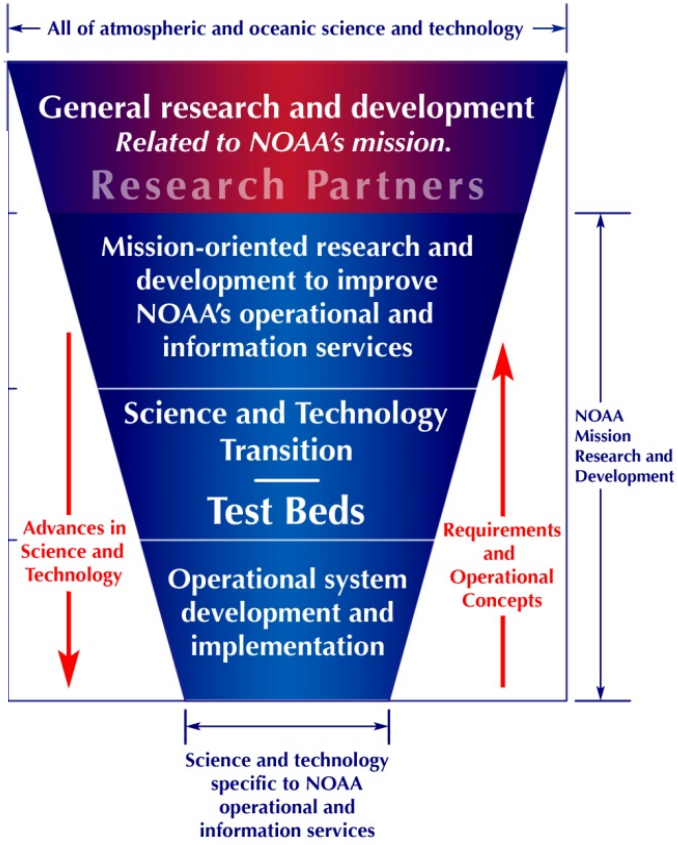
- CSTAR FFO links results to testing in OPG; use of NWS Virtual Laboratory
- FFOs for coordinated projects at TBPG (USWRP, NGGPS programs)

TB-- for developmental testing

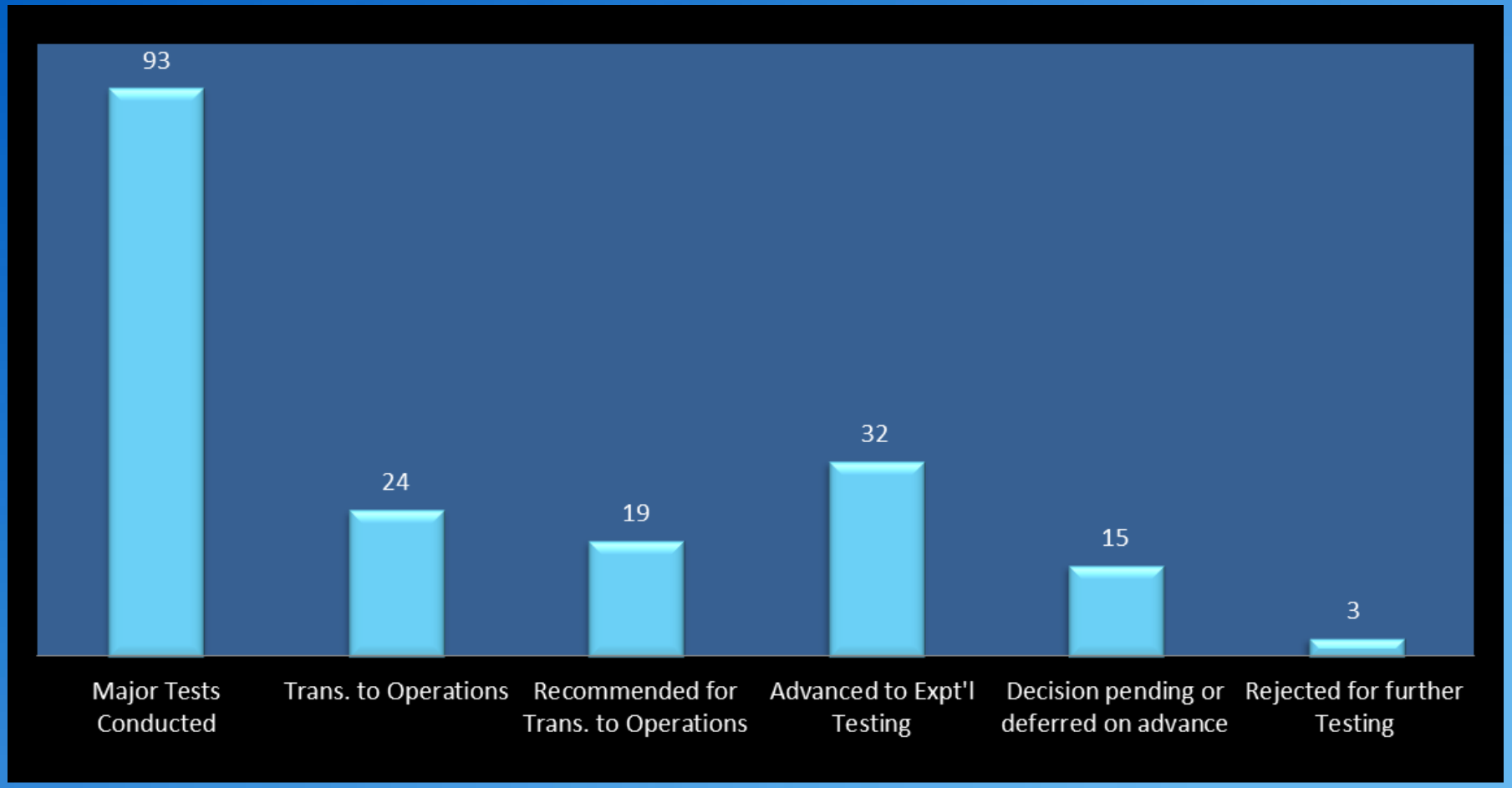
PG-- for pre-deployment (experimental) testing of advanced operations, services and S&T capabilities

Framework for Transition: NOAA and Partners

	Phase	Key Q	Key Metric	Facility
	R&D	Does it work?	Peer-reviewed Publication	Universities, Government Labs, Private Industry
TR →	Developmental Testing	Works with operational systems?	Feasibility/ Engineering Analysis Successful	Testbed with operations-like environment
PG →	Experimental Testing	Meets operational performance criteria?	Go/No Go based on: Objective Performance (e.g. accuracy) Subjective Feedback Production Readiness	Operational proving ground for clinical tests and full "dress rehearsal"
	Operations	Maintains required performance?	Objective criteria: accuracy and reliability	Operations



NOAA TBPG Transition Testing in 2015: Preliminary Summary



NOAA TBPG Coordinating Committee

- Comprised of TBPG managers and LOTM-designated LO focal points:
- Activities:
  - Monthly virtual meetings featuring TBPG recent tests/results
  - Coordination/Outreach: TBPG coordination website www.testbeds.noaa.gov, coordinated inputs for NOAA initiatives, one-on-one tutorials on guidelines, testing protocols
  - Organizes annual workshops on NOAA testbeds/proving grounds
  - Adopted recommended approach to metrics for recognizing progress, Fall 2012:
    - Relevance, quality, and effectiveness/efficiency
    - Accomplishments and performance metrics provided in annual TBPG progress reports
  - Coordinates NOAA programmatic activities & announcements of opportunity
  - Summary publication (Ralph, Intrieri, et al.): *The emergence of weather-focused testbeds linking research and forecasting operations*. BAMS, 94, 1187-1210, 2013

Special Programmatic Activities FY16

- NGGPS initiative
  - Multi-year effort to develop NOAA's next-generation operational model for global environmental prediction
    - Foundation for NWP; from windowing for storm-scale out to space weather domain
  - Implementation Plan includes testbed contributions toward improving forecast skill in several specific service areas: Days 6-10, Weeks 3-4, high-impact weather at storm-scale (days 0-3)
  - Generalized testing coordination/collaboration approach
  - Round I FFO funded projects include 9 involving testbed participation
  - Round II FFO proposals under review; awards expected by Q4FY16
- Other NOAA-wide programmatic efforts (RTAP); USWRP-funded work (JHT, HWT, HMT)

TBPG Annual Workshop

- TBPG Workshop: College Park MD, April 5-6 , 2016
  - Overviews of 12 NOAA TBPG:
    - Top FY15 highlights and FY16 activities, Transitions
  - Science Theme: Advances in NOAA's Environmental Intelligence. Presentations on work conducted at TBPG, competitively selected. Best paper competition, based on
    - technical excellence: potential impact, of the work on NOAA missions to deliver environmental intelligence
    - rigor of testing methods
    - degree of collaboration across testbeds/proving grounds
    - Clear and compelling presentation
  - New Arctic Testbed (Oct 2015)
  - Emerging and Affiliated Capabilities

Thank You!

NOAA TBPG CC Executive Officer: Lee Cajina

Host Committee Chair: Dave Novak, WPC Director

TBPG Workshop Organizing Committee:

Chris Landsea, Kim Runk, Dave Novak, Mike Uhart (retired), Paula Davidson

Backup

Annual Workshops

- Highlight/promote integrated testing opportunities in NOAA TBPG
- Overviews from current/emerging TBPG, affiliated capabilities
- Integrating Science Themes and Best Paper Awards:
  - 3rd Annual TBPG Workshop: Intense Precipitation Events (2012)
  - 4rd Annual TBPG Workshop: High-impact Environmental Events (2013)
  - 5th Annual TBPG Workshop: Advances in Environmental Prediction (2014)
  - 6th Annual TBPG Workshop: Advances in Environmental Intelligence (2015)
  - **7th Annual TBPG Workshop: Advances in Communicating Probabilistic Environmental Intelligence and Forecast Information**

Framework for R2O/O2R:
Phased Implementation into NWS Operations

	Phase	Key Q	Key Metric	Facility
	R&D	Does it work?	Peer-reviewed Publication	Universities, Government Labs, Private Industry
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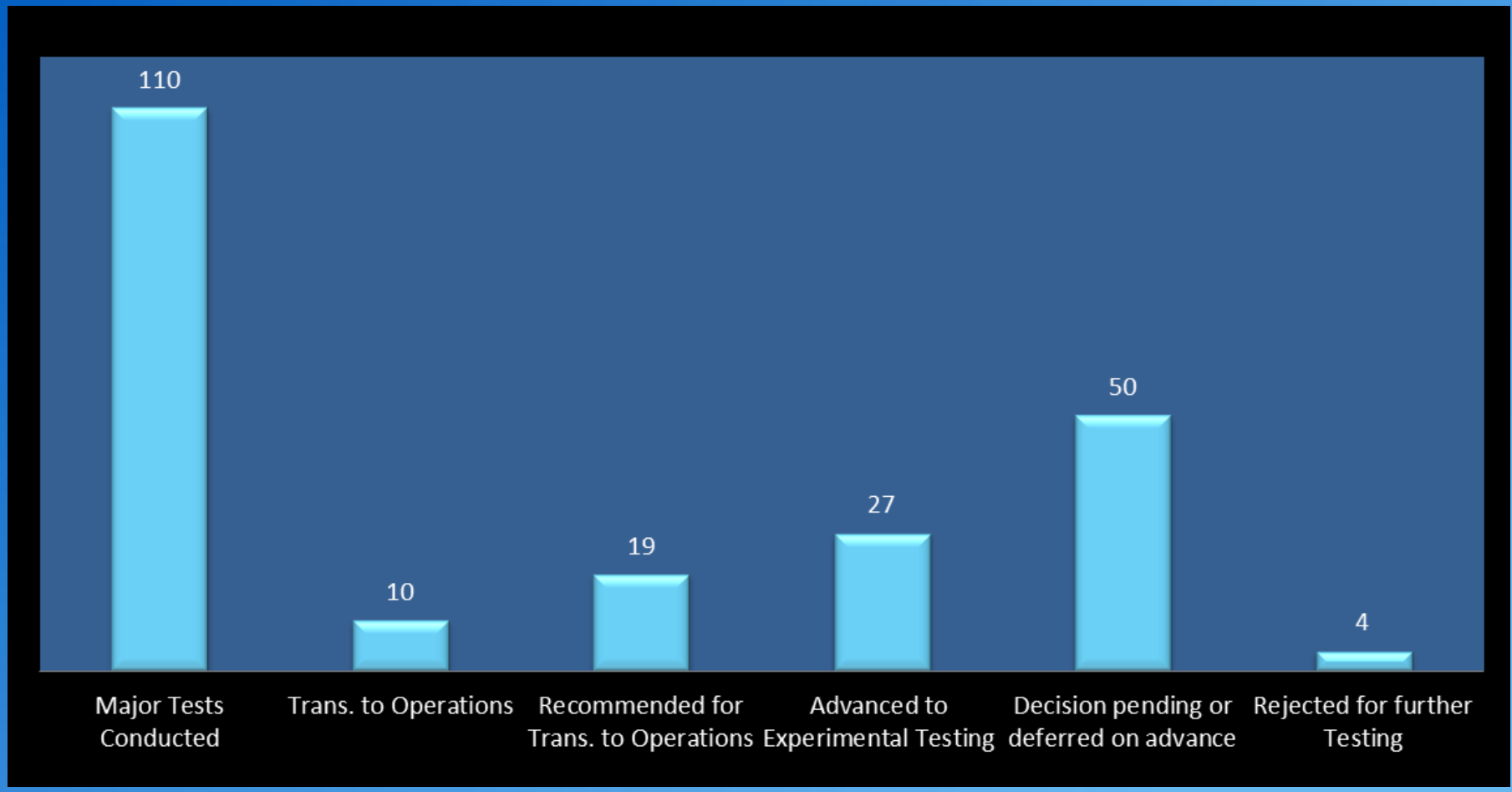
NOAA TBPG Transitions in 2014



Guidelines: Roles and Responsibilities

NOAA participants

Host facilities:

- Develop and maintain Charter and/or Terms of Reference (see governance)
- Establish and lead management team, to oversee, support and facilitate testing operations (see function/execution)
- Lead management team, establish executive oversight committee
- Participate in NOAA-wide coordinating TB/PG coordinating committee

Research partners (outside host facility):

- Participate in peer-review and provide testing support

Operations partners (outside host facility):

- Provide statement of needs/requirements and testing support

External participants

- Respond to announcements of opportunities for testing advanced S&T to support NOAA's operational mission requirements
- Participate in testing and evaluation

Guidelines: Testbed Functions

Testbeds/testbed personnel, under local testbed management:

- Conduct controlled testing of peer-reviewed capabilities to determine if they can work with operational systems
- Provide announcements of opportunity for testing
- Prioritize tests through peer review recommendations, subject to oversight
- Assist/facilitate testing
- Report plans and results at least annually (Management Team)

Guidelines: Proving Ground Functions

Proving grounds personnel/local management function similarly to testbeds

- Conduct controlled real-time testing of capabilities proven to work with operational systems
  - Assess workflow, workload options and impacts; including collaborative operations
  - Determine operational readiness
- Provide announcements of opportunity that identify additional criteria for Proving Ground consideration: e.g. having passed testbed/developmental testing, and demonstrated impact on meeting operational requirements
- Prioritize testing
- Assist/facilitate testing and participate in review/approval processes for implementing into operations
- Report plans and results at least annually (management)

Guidelines: Governance

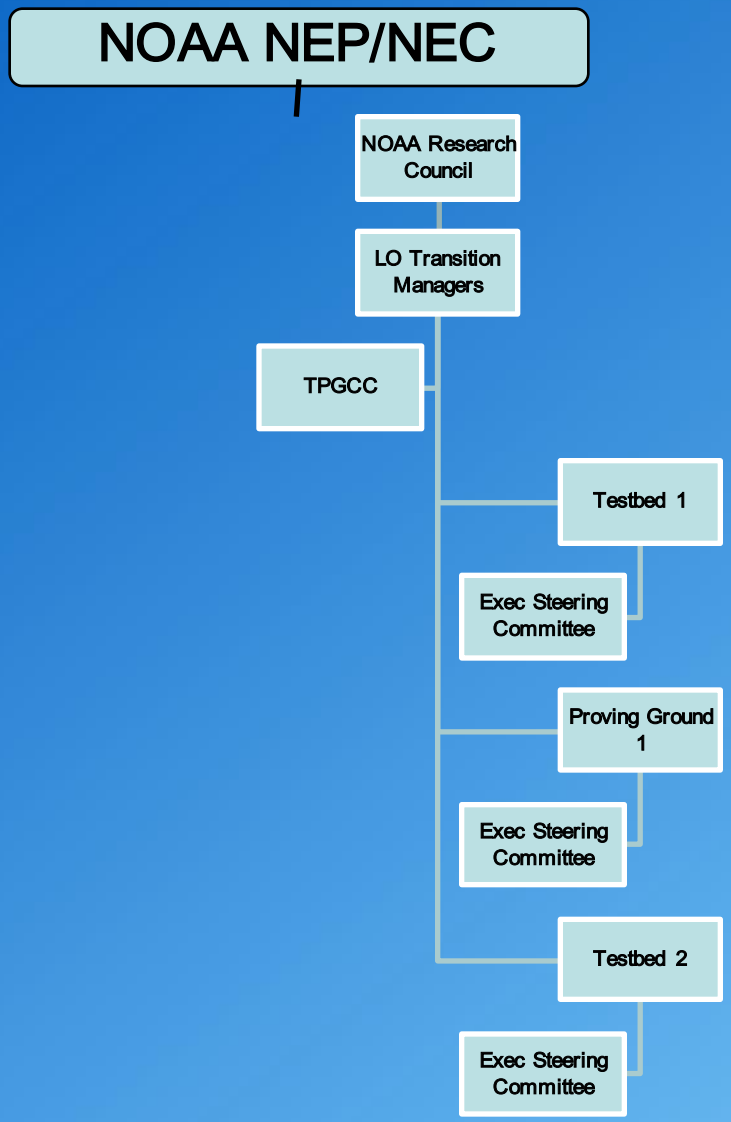
Major aspects

- Local management teams: conduct/support testing operations, report results
- Executive committees/boards: apply strategic and funding considerations in oversight/review of activities, selection of tests, and quality of results
- Coordinating Committee of TB/PG managers and LO focal points: facilitate communication and to provide coordination and consistency among TB/PG

Charters/Terms of Reference: Each TB/PG should develop and maintain

- Outlines scope, operations, and governance, including general procedures, infrastructure requirements and availability of staff and other testing support
- Authority for charters should be the executive oversight committee, or its designee

Governance


NOAA NEP/NEC
NOAA Research Council
LO Transition Managers
TPGCC
Testbed 1
Exec Steering Committee
Proving Ground 1
Exec Steering Committee
Testbed 2
Exec Steering Committee

Working Definitions: Testbed

Testbed:

- A working relationship for developmental testing, in a quasi-operational framework among researchers and operational scientists/experts (such as measurement specialists, forecasters, IT specialists) including partners in academia, the private sector and government agencies, aimed at solving operational problems or enhancing operations, in the context of user needs.
- A successful testbed involves physical assets as well as substantial commitments and partnerships.

What is tested?

- Advances to be considered include peer-reviewed candidates for more effective observing systems, better use of data in forecasts, improved forecast models, and applications for improved services and information with demonstrated economic/public safety benefits.

Working Definitions: Proving Ground

Operations and Services Proving Ground:

- A framework for NOAA/NWS to conduct testing of advanced operations, services and science and technology capabilities that address the needs of both internal and external users. Successful testing demonstrates readiness to implement into operations.

What is tested?

- Capabilities that have already passed developmental testing. Such capabilities include advanced observing systems, better use of data in forecasts, improved forecast models, and applications for improved services and information with demonstrated economic/public safety benefits.

Guidelines Development

NOAA LOTMs approved the guidelines prepared by an ad hoc committee:

NWS: Paula Davidson, Jason Tuell, Louis Uccellini

OAR: John Gaynor, Steve Koch, Roger Pierce, Marty Ralph

Followed guiding principles:

- Policy Context:
  - NOAA and NWS Strategic Plans, NOAA Research Plans, S&T and Services Roadmaps, NOAA research/laboratory reviews, NOAA science review policy
  - Complement activities in existing transition processes
- Roles and responsibilities; Function and execution
  - Incorporate best practices from current TB/PG charters and terms of reference
- Governance:
  - Promote consistency, but not uniformity, among testbeds and proving grounds
  - Involve appropriate stakeholders
  - Propose formal coordination among /across facilities

Performance Reporting

- Outcome of Spring 2012 Workshop: TB/PG should take more credit for progress
- Development:
  - Working group developed whitepaper on TB/PG Performance Measures (based on NOAA guidance documents, 5/12- 8/12)
  - Performance Measures adopted by TBPGCC, 9/12
  - LOTMs (TBPGCC Oversight body) approved on 10/12
- Recommendations:
  - Each facility should tailor performance measures from generalized language, in areas of relevance, quality, effectiveness/efficiency
  - Guidance for annual TBPG reports includes documenting testing activities, summary results, performance metrics